

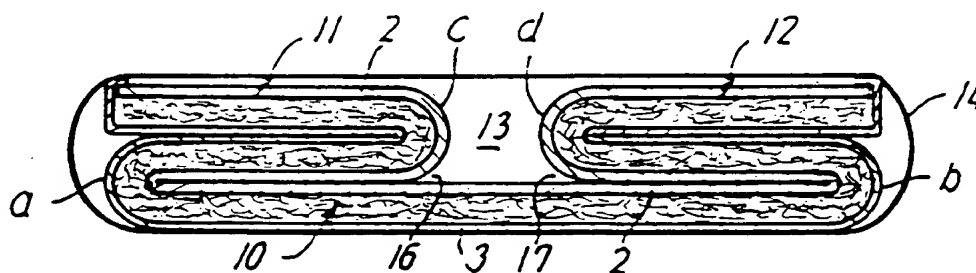
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/DK92/00087 <b>(22) International Filing Date:</b> 19 March 1992 (19.03.92)  <b>(30) Priority data:</b> 1684/91                      2 October 1991 (02.10.91)                      DK  <b>(71) Applicant (for all designated States except US):</b> COLO-PLAST A/S [DK/DK]; Egevangen 4, DK-2980 Kokkedal (DK).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only) :</b> PEDERSEN, Jens [DK/DK]; Carinaparken 64, DK-3460 Birkerød (DK). STRARUP, Annette [DK/DK]; Tornevangsvej 16, DK-3460 Birkerød (DK).  <b>(74) Agents:</b> RAFFNSØE, Knud, Rosenstand et al.; International Patent-Bureau, Høje Taastrup Boulevard 23, DK-2630 Taastrup (DK).		<b>(81) Designated States:</b> AU, CA, FI, JP, NO, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE).  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Danish).</i>

**(54) Title:** A URINE INCONTINENCE PAD FOR FEMALES AND A METHOD FOR ITS PRODUCTION**(57) Abstract**

A urinary incontinence pad for females comprises at least one comparatively flat cushion-shaped absorption body placed between a liquid-impermeable barrier layer on the underside and a liquid-dispersive tissue layer on the upper side and surrounded by a cover of nonwoven fabric material. The absorption body, the liquid-dispersive layer thermoplastically bonded thereto and the barrier layer may as a unitary structure (6) be folded into a configuration of an inverted pleat in which a longitudinal interspace between the top layers (11, 12) facing the user operates as a drainage channel (13) to a subjacent coherent backing layer (10). The absorption body contains a uniform distribution of superabsorbent material and an addition of thermoplastic fibers to obtain a reinforced network structure and said thermoplastic bonding of the liquid-dispersive layer. The product may include a number of absorption bodies with varying concentration of superabsorbent material and such designs may as internal liquid transfer layers include a plane non-folded body of cellulose fibers without superabsorbent material.

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A Urine Incontinence pad for females and a method for its production.

The invention relates to a urinary incontinence pad for females and of the type comprising at least one relatively flat cushion-shaped absorption body made from a cellulose absorbent material arranged in a surrounding cover which at least on the side facing the user is liquid-permeable, the absorption capability at least in a part of at least one absorption body being increased by means of superabsorbing absorbent material.

Heavy demands on absorption properties and comfort in daily use are made on urinary incontinence pads which must be capable of receiving significant liquid amounts. Such an incontinence pad must inter alia be usable in combination with ordinary clothing without noticeable inconveniences, such as sounds, when the user moves. It must have a very high absorption capacity at comparatively small physical dimensions and at the same time the side facing the user must as far as possible be felt dry.

These demands are difficult to satisfy by known absorbing disposable articles consisting of a body of an absorbent material, such as cellulose fibers placed between a liquid-impermeable barrier layer and a liquid-permeable layer consisting most often of a non-woven fabric. The addition of so-called superabsorbing materials to local areas of the absorption body may entail an improvement but not always to a sufficient extent whereas the design becomes complicated because precautions must be taken to prevent the superabsorbing material from coming into contact with the skin.

In relation to the previous absorbing disposable articles it is the object of the invention to provide an improved design of the product which is in particular

ar capable of satisfying the above mentioned functional demands on a urinary incontinence pad.

In order to accomplish this a urinary incontinence pad according to the invention is characterized in that the absorption body or bodies is/are placed between a subjacent liquid-impermeable barrier layer and a superjacent liquid-dispersive layer of a material having good liquid transfer properties in the plane of the layer, said liquid-dispersive layer being thermoplastically bonded to an absorption body containing a uniform distribution of superabsorbent material and an addition of thermolastic fibers to obtain said thermoplastic bonding of the liquid-dispersive layer and form a reinforced network structure with a view to an orderly localization of the superabsorbent material in the body, the surrounding cover consisting as a whole of a nonwoven fabric.

The use of a superjacent liquid-dispersive layer, e.g. a tissue layer on the side facing the user, and the uniform distribution of superabsorbent material which through the addition of thermoplastic material is bonded in a reinforced network structure results in a complete utilization of the absorption capacity throughout the absorption body and allow for manufacturing a high-absorbent product with comparatively small dimensions, the liquid-dispersive layer having moreover turned out to be sufficient to prevent skin contact with the superabsorbent material. The wrapping of the entire structure constituted by the absorption body, the liquid-dispersive layer and the barrier layer with a cover of nonwoven material ensures a great comfort for the user and a good retainment of the pad in ordinary undergarment, a pressure sensitive adhesive tape being applied on the rear side in a manner known per se, i.e. the side of the surrounding cover facing away from the user.

A pad appropriate for smaller liquid amounts according to the invention may simply consist of a plane non-folded cushion-like absorption body disposed in the surrounding cover.

5           A larger absorption capacity may be obtained in that a single absorption body with said uniform distribution of superabsorbent material in a reinforced thermoplastic network structure and the liquid-dispersive layer bonded thermoplastically thereto and the barrier  
10 layer are folded as a unitary structure at parallel folding lines into a configuration of an inverted pleat, wherein side portions of a rectangular base body constitute double-folded top layers facing the user and having a longitudinal interspace serving as a drainage  
15 channel to a subjacent coherent backing layer, the absorption body thus pleated being positioned within the surrounding cover.

Absorbing products in which the absorption body is folded in a configuration of an inverted pleat are  
20 known per se from GB patent No. 1 011 888, DK-B-117 374, US patent No. 3 592 194, FR patent No. 2 301 189 and NO patent No. 164 074.

In some of said designs, in particular intended for use as disposable napkins for children as well as  
25 for adults the purpose of the inverted-pleat-folding has mainly been to obtain an improved conformity to the user's anatomy, by providing a crutch section folded as an inverted pleat in the position of use whereas end sections beyond the crutch section are non-folded.

30           According to a design of the above mentioned type known from the above referenced DK-B-117 374 the inverted-pleat-folding is used to provide an accumulation space for liquid penetrated through the surrounding cover, said space being in communication  
35 with capillar interspaces between the parallel layers of absorbent material in the inverted-pleat-folding in

order to obtain a high absorption capacity also in case of a sudden strong liquid flow.

According to an embodiment disclosed in NO-B-164 074 of a liquid absorbing disposable product of the above mentioned type intended for use as disposable napkins for children and adults, diapers or bandages the absorption body folded as an inverted pleat forms three successive layers, viz. the coherent backing layer and the double-folded top layer the upper side of which faces the user with an interspace forming said drainage channel with the purpose of ensuring a transfer of liquid away from the user's skin to the backing layer. In order to obtain an enhanced liquid collecting capacity in the backing layer only this layer includes an addition of superabsorbent material. In this design the surrounding cover forms in itself the liquid-impermeable barrier layer as well as the liquid-permeable layer facing the user, whereas the absorption body comprising a layer of cellulose fluff supported by a thinner layer of cellulose was is uncovered in the surrounding cover.

The inverted-pleat-folding of the absorption body with an even ly distribution of superabsorbent material through the entire body contributes to ensuring a very high absorption capacity with small physical dimensions and by letting the liquid dispersive layer as well as the impermeable barrier layer follow the inverted-pleat-folding a good security is obtained against skin contact with the superabsorbent material and at the same time the liquid dispersive layer and the uniform distribution of the superabsorbent material ensure a good liquid distribution and utilization of the entire absorption body. Moreover, the positioning of the barrier layer between consecutive layers of the inverted-pleat-folding prevents the liquid collected in the coherent backing layer and the

superjacent layer from propagating into the layer closest to user which layer is thereby still felt dry.

Finally, the thermoplastic bonding of the liquid dispersive layer to the absorbent material also in the folded design entails a fastening of the superabsorbent material in a reinforced three-dimensional network structure and secures against mutual displacement of the material layers, thereby also preventing agglomerations of absorbent material even after considerable liquid absorption.

According to a development of the invention the absorbing disposable product may comprise a number of superposed absorption bodies with associated thermoplastically bonded liquid dispersive layers, of which merely one body on the underside is connected with the barrier layer while at least one layer contains said even distribution of superabsorbent material and at least one body is a plane non-folded body.

Through variation of the quantity of superabsorbent material in the individual absorption bodies and possible incorporation of a supplementary strongly liquid transferring body between two absorption bodies it has been made possible to obtain an optimum adaptation of the absorption capacity and comfort to user's different requirements.

In an embodiment of such a disposable article with a number of absorption bodies the plane, non-folded body may thus constitute a lower body with a barrier layer on the underside, whereas an upper body is folded in a configuration of an inverted pleat with thin side portions and a central portion operating as drainage channel in contact with the liquid dispersive layer of the lower body, both bodies containing evenly distributed superabsorbent material but with a higher concentration in the lower body than in the upper body.

In a second embodiment the plane non-folded body is made from cellulose fibers without superabsorbent

material and is surrounded on the underside and apart from a central portion operating as drainage channel also on the upper side by a body folded in a configuration of an inverted pleat and containing said  
5 uniform distribution of superabsorbent material, said pleated body being connected with a barrier layer on the underside below the plane body and in elevated side portions, whereas the liquid dispersive layer is thermoplastically bonded to edge portions on both sides of  
10 said drainage channel and which are lowered into the inverted-pleat-folding.

In a further embodiment such an absorbing disposable article may according to the invention comprise three superjacent plane non-folded bodies of which a  
15 lower body on the underside is connected with a barrier layer and this body as well as an upper body contain superabsorbent material, however with a larger concentration in the lower body than in the upper body, while an intermediate body of cellulose fibers and  
20 thermoplastic fibers without superabsorbent material constitutes a liquid transfer layer between the upper and the lower body.

The invention further relates to a method of manufacturing a urinary incontinence pad, said method  
25 being characterized in that a layer of liquid dispersive materials is applied to a web of absorbent material with a uniform distribution of superabsorbent material and addition of thermoplastic fibers and is by thermal treatment bonded thermoplastically to the absorbent  
30 material, following which the web possibly after superposition with one or more of subjacent webs is fastened to a web of liquid impermeable barrier material and that absorption bodies with thermoplastically bonded liquid dispersive layer and barrier layer are provided  
35 by cutting from the web configuration thereby obtained and wrapped in a nonwoven fabric web material cut off to provide the surrounding cover.



In order to provide a safe encapsulation of the absorption body with a barrier against escape of the superabsorbent material it is preferred that the severed lengths of nonwoven fabric web material are coated at the ends with an adhesive acting as barrier layer for the superabsorbent material.

The invention will now be explained in detail in the following with reference to the schematical drawings, in which

Fig. 1 is a cross-sectional view of a first embodiment of an absorbing disposable article suitable as a urinary incontinence pad according to the invention,

Fig. 2 is an enlarged section of Fig. 1,

Figs 3 and 4 are cross-sectional views of two alternative embodiments,

Figs 5, 6 and 7 are cross-sectional views of further embodiments with a number of absorption bodies, and

Fig. 8 is a plan view of an incontinence pad according to the invention.

The pad illustrated in Fig. 1 has a substantially rectangular shape and consists of a comparatively flat cushion-shaped absorption body 1 placed between a liquid-dispersive layer 2 of a material with good liquid transfer properties in the plane of the layer which layer is positioned on the side which will subsequently face the user, and a liquid-impermeable barrier layer 3 on the side facing away from the user.

As a main component the absorption body 1 may consist of cellulose fibers in which superabsorbent particles, fibers or granulates 4, e.g. in an amount corresponding to 20 to 40% by weight of the absorption body, are evenly distributed throughout the body 1, as illustrated in the enlarged section in Fig. 2. Accord-

ing to the invention the absorption body 1 further accommodates an addition, not shown in the drawings, of thermoplastic fibers the function of which will be explained in detail in the following. The thermoplastic  
5 fibers may for instance consist of polyethylene fibers in an amount corresponding to 10 to 20% by weight of the absorption body 1.

The liquid-dispersive layer 2 on which demands are made for good liquid transfer properties in the  
10 plane of the layer may preferably consist of a tissue layer, e.g. of fibrous paper material, and covers the entire upper side of the body 1.

The liquid-impermeable barrier layer 3 is a film of an impermeable plastic material, e.g. poly-  
15 ethylene or polypropylene, and is so much larger than the absorption body 1 that it may bent around its edges and in over the upper side of the body so as to overlap the edge portions of the layer 2, and be connected therewith by means of an adhesive.

20 The pad is produced in that a web of liquid dispersive material is placed on a web of absorption material with a uniform distribution of superabsorbing particles, fibers or granules. In a following thermal treatment the thermoplastic fibers in the absorption  
25 material are softened, thereby obtaining, one on hand, a thermoplastic bonding of the liquid dispersive material to the absorption material and, on the other hand, a stabilization of the superabsorbent particles, fibers or granulates in a reinforced three-dimensional network  
30 structure. After this treatment the absorption web is fastened to a web of liquid-impermeable barrier material with an increased width so that lateral parts of this material may be bent around the side edge of the absorption body and fastened to the liquid dis-  
35 persive layer 2.

The structure consisting of the absorption body 1, the liquid-dispersive layer 2 and the barrier

layer 3 is obtained by cutting convenient lengths from the webs thus united and is wrapped in a nonwoven fabric web material cut off to create the surrounding cover. In order to prevent escape of superabsorbent materials at the ends exposed by cutting and thus prevent the superabsorbent material from getting into skin contact through the nonwoven fabric web material in the surrounding cover for the absorbent material the ends 7 and 8 of the cut lengths 9 of the nonwoven fabric web material may as illustrated in the plane view in Fig. 8 be coated with an adhesive acting as barrier layer.

In the embodiment illustrated in Fig. 3 a base body produced in the same manner as described above is at parallel folding lines formed to an inverted pleat configuration with a coherent backing layer 10 and atop thereof two double-folded top layers 11 and 12 with a longitudinal interspace 13 operating as a drainage channel when the pad in use is placed with the top layers 11 and 12 facing the user.

In this embodiment the liquid dispersive layer 2 as well as the barrier layer 3 follow the entire configuration folded as an inverted pleat and surrounded by the cover 14.

When the pad in use receives liquid in connection with involuntary discharge of urine, the liquid hits, on one hand, the drainage channel 13 and, on the other hand, the part of the liquid dispersive layer in the top layers 11 and 12 closest to the user. Due to the good liquid transfer properties of the layer 2 in its own plane a quick dispersion of the liquid is effected. Part of the liquid flows directly through the non-woven layer of the cover 14 and the drainage channel 13 to the coherent backing layer 10 in which the dispersive effect causes an even liquid

10

distribution also into the pockets 16 and 17 created between the backing layer 10 and the top layers 11 and 12. Even though part of the supplied liquid is also absorbed in the top layers 11 and 12 proper a  
5 larger amount will be concentrated in the backing layer 10 since, moreover, the barrier layer 3 will prevent liquid from flowing to the backing layer 10 or into the pockets 16 and 17 from seeping back to the top layers 11 and 12 so that said top layers are felt  
10 relatively dry even after use for a long time.

In the embodiment in Fig. 4 in which components corresponding to those illustrated in Fig. 3 have the same reference numerals, the inverted pleat folding is performed in such a way, e.g. by making the backing  
15 layer 10 narrower, that lateral parts 18 and 19 of the top layers 11 and 12 protrude beyond the side edges of the backing layer 10. An improved conformity of the comparatively compact pad to user's anatomy is thereby obtained, in the same manner as actually known  
20 from US patent No. 4 041 950.

While all of the above described embodiments comprise only a single absorption body with uniform concentration of superabsorbent material through the entire body, Figs 5, 6 and 7 schematically show embodi-  
25 ments with a number of absorption bodies, suitable in particular in more severe cases of incontinence, and by which an optimum fulfilling of user's specific requirements as regards absorption capacity and comfort is obtained through variation of the concentration of  
30 superabsorbent material in the individual bodies and regulation of the liquid dispersive effect and the vertical liquid transfer transversely to the absorption bodies. Thus, absorption bodies with a uniform absorbing effect across the entire surface may for  
35 instance be created, thereby avoiding spillover in case of larger amounts of flow.

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In the embodiment in Fig. 5 an upper body 22 is disposed atop a plane non-folded lower body 20 which on its underside is connected with a barrier layer 21 and on the upper side has a thermoplastically bonded liquid dispersive layer 21a, said upper body being thermoplastically bonded to a superjacent liquid dispersive layer 23 and folded at parallel folding lines in a configuration of a comparatively open inverted pleat, in which thin lowered edge portions 24 and 25 and a lowered central portion 26 acting as a drainage channel are separated by two elevated portions 27 and 28.

Either of the bodies 20 and 22 contains a uniform distribution of superabsorbing cores, fibers or granulates but in a substantially larger concentration, e.g. 30 to 50% in the lower body 20 than in the upper body 22, in which the concentration may range from 10 to 20%.

In the embodiment in Fig. 6 an absorption body 29 is folded in a configuration of an open inverted pleat about a plane, non-folded body 30 so that it covers the underside of the entire body 30 and also its upper side apart from a narrow central portion 31 acting as drainage channel.

In this embodiment only the folded body 29 contains an even distribution of superabsorbent material and an addition of thermoplastic fibers, whereas the plane non-folded body 30 consists solely of cellulose fibers (or fluff) and thermoplastic fibers and forms an inner liquid dispersive layer implying a very effective transfer to and distribution of liquid in the subjacent part of the folded body 29.

The barrier layer 32 is disposed on the underside of the folded body 29 and has such a width that it may be passed up over and cover raised side portions 33 and 34 of the body 29.

As regards the body 29 the liquid dispersive layer 35 is applied and thermoplastically bonded solely to the lowered edge portions 36 and 37 of the body 29 which are positioned on either side of the drainage channel 31.

In the embodiment in Fig. 7 the illustrated incontinence pad includes a lower body 38, an upper body 39 and an intermediary body 40 operating as an internal liquid transfer layer and having a larger width than the bodies 38 and 39 of which the lower body 38 is again a little narrower than the upper body 39. This provides for obtaining in the same manner as in the embodiment in Fig. 4 a good fit to user through the thinner edge portions 41 and 42 formed by the edge portions of the intermediate body 40 positioned outside bodies 38 and 39.

As in the embodiment in Fig. 6, the intermediate body 40 consists solely of cellulose fibers or fluff with the addition of thermoplastic fibers but without superabsorbent material, while the lower body 38 and the upper body 39 both contain an even distribution of superabsorbent material which through the addition of thermoplastic fibers is bonded in a reinforced network structure. In the same manner as in the embodiment in Fig. 6 the concentration is substantially higher in the lower body 38 than in the upper body 39.

The barrier layer 43 covers the underside of the lower body 38 and the projecting side portions 41 and 42 of the intermediate layer 40 whereas the upper sides of the bodies 38, 39 and 40 are covered by liquid dispersive layers 38a, 39a and 40a, respectively.

## P A T E N T   C L A I M S

1. A urinary incontinence pad for females and of the type comprising at least one relatively flat cushion-shaped absorption body (1; 6; 20, 22; 29, 30; 38, 39, 40) made from a cellulose absorbent material arranged in a surrounding cover (5, 14) which at least on the side facing the user is liquid-permeable, the absorption capability at least in a part of at least one absorption body being increased by means of superabsorbing absorbent material (4), characterized in that the absorption body or bodies (1; 6; 20, 22; 29, 30; 38, 39, 40) is/are placed between a subjacent liquid-impermeable barrier layer (3, 21, 32, 43) and a superjacent liquid-dispersive layer (2; 21a, 23; 35; 38a, 39a) of a material having good liquid transfer properties in the plane of the layer, said liquid-dispersive layer being thermoplastically bonded to an absorption body (1; 20, 22; 29; 38, 39) containing a uniform distribution of superabsorbent material (4) and an addition of thermolastic fibers to obtain said thermoplastic bonding of the liquid-dispersive layer (2; 23; 35; 38a, 39a) and form a reinforced network structure with a view to an orderly localization of the superabsorbent material in the body, the surrounding cover (5, 14) consisting as a whole of a nonwoven fabric.

2. A urinary incontinence pad according to claim 1, characterized in that a single absorption body (1) with said uniform distribution of superabsorbent material and addition of thermoplastic fibers together with the liquid-dispersive layer (2) bonded thermoplastically thereto and the barrier layer (3) are folded as a unitary structure (6) at parallel folding lines (a-d) into a configuration similar to an inverted pleat, wherein side portions of a rectangular base body constitute double-folded top layers (11, 12) facing the user and having a longitudinal interspace (13) serving

as a drainage channel to a subjacent coherent backing layer (10), the absorption body (6) thus pleated being positioned within the surrounding cover (14).

3. A urinary incontinence pad according to claim  
5 2, characterized in that the liquid-dispersive layer (2; 23; 35; 38a,39a) consists of a fibrous paper material acting as barrier layer for the superabsorbent material (4) in the absorbent material.

4. A urinary incontinence pad according to claim  
10 2 or 3, characterized in that the barrier layer (3) is folded over the side edges of the base body and covers a narrow edge portion of the liquid-dispersive layer (2) on the upper side.

5. A urinary incontinence pad according to claim  
15 2, 3 or 4, characterized in that the folding of the base body is effected so that lateral portions (18, 19) of the upper top layer (11, 12) facing the user project beyond the lateral edges of the coherent backing layer (10).

20 6. A urinary incontinence pad according to claim 4, characterized in that it comprises a number of superjacent absorption bodies (20, 22; 29, 30; 38, 39, 40) with associated thermoplastically bonded liquid-dispersive layers of which merely one body (20, 29, 38)  
25 on the underside is connected with the barrier layer (21, 32, 43) while at least one body contains said even distribution of the superabsorbent material and at least one body (20; 30; 38, 39, 40) is a plane non-folded body.

30 7. A urinary incontinence pad according to claim 6, characterized in that the the plane, non-folded body (20) is a lower body with a barrier layer (21) on the underside, whereas an upper body (22) is folded in a configuration of an inverted pleat with thin side portions (24, 25) and a central portion (26) operating as  
35 drainage channel in contact with the liquid-dispersive



layer of the lower body (20), both bodies (20, 22) containing evenly distributed superabsorbent material but with a higher concentration in the lower body (20) than in the upper body (22).

5           8. A urinary incontinence pad according to claim 6, characterized in that the plane non-folded body (30) is made from cellulose fibers without superabsorbent material and is surrounded on the underside and apart from a central portion operating as drainage channel  
10 (31) also on the upper side by a body (29) folded in a configuration of an inverted pleat and containing said uniform distribution of superabsorbent material, said pleated body (29) being connected with a barrier layer (32) on the underside below the plane body (30) and in  
15 elevated side portions (33, 34) whereas the liquid-dispersive layer is thermoplastically bonded to edge portions (36, 37) on both sides of said drainage channel and which are lowered into the inverted-pleat-folding.

20           9. A urinary incontinence pad according to claim 6, characterized in that it comprises three superjacent plane non-folded bodies (38, 39, 40) of which a lower body (38) on the underside is connected with a barrier layer (43) and this body as well as an upper body (39)  
25 contain superabsorbent material, however with a larger concentration in the lower body (38) than in the upper body (39), while an intermediate body (40) of cellulose fibers and thermoplastic fibers without superabsorbent material constitutes a liquid transfer layer between  
30 the upper and the lower body (39, 38).

          10. A urinary incontinence pad according to claim 9, characterized in that the intermediate body (40) has a larger width and length than the upper and the lower bodies (39, 38) and that the barrier layer  
35 (43) has a width that is so much larger than the lower body (38) that side portions of it may be folded in

over and cover side portions (41, 42) of the intermediate body (40) outside lateral edges of the upper body (39).

11. A method of manufacturing a urinary incontinence pad according to any of the preceding claims, characterized in that a layer of liquid dispersive materials is applied to a web of absorbent material and addition of thermoplastic fibers and is by heat treatment bonded thermoplastically to the absorbent material, following which the web possibly after superposition with one or more of subjacent webs is fastened to a web of liquid impermeable barrier material and that absorption bodies with thermoplastically bonded liquid dispersive layer and barrier layer are provided by cutting from the web configuration thereby obtained and wrapped in a non-woven fabric web material cut off to provide the surrounding cover.

12. A method according to claim 11, characterized in that the cut lengths of nonwoven fabric material are coated (impregnated) at the ends with an adhesive acting as barrier layer for superabsorbent material.

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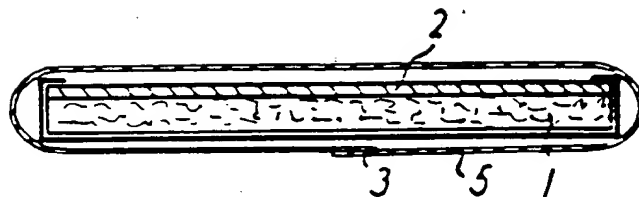


FIG. 1

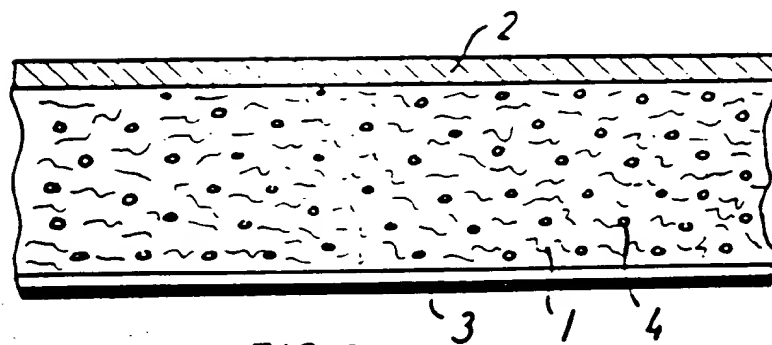


FIG. 2

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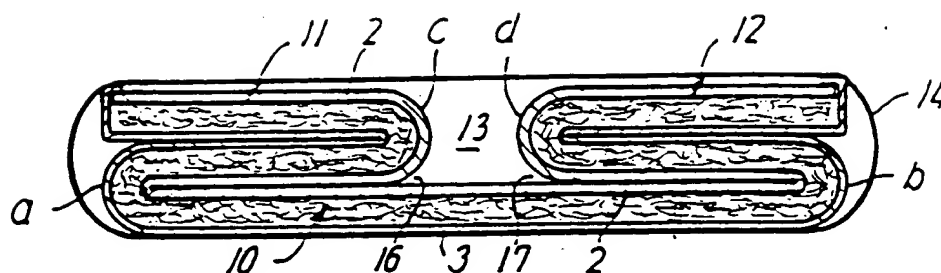


FIG. 3

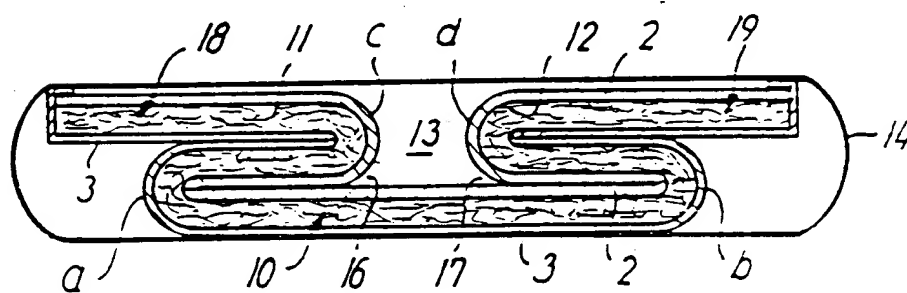


FIG. 4

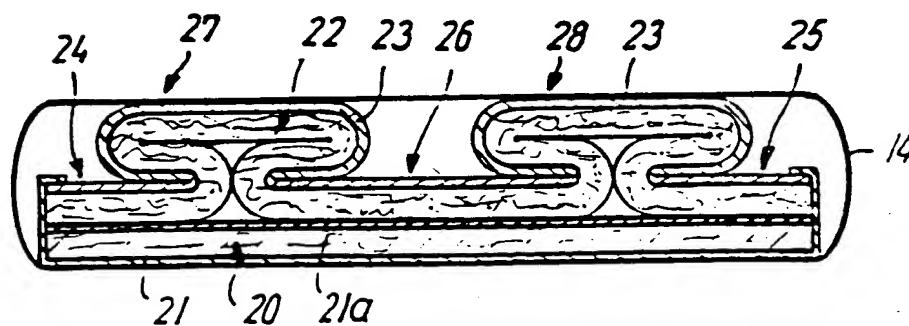


FIG. 5

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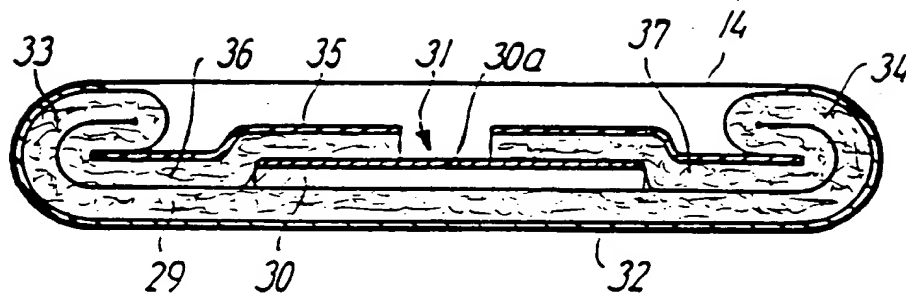


FIG. 6

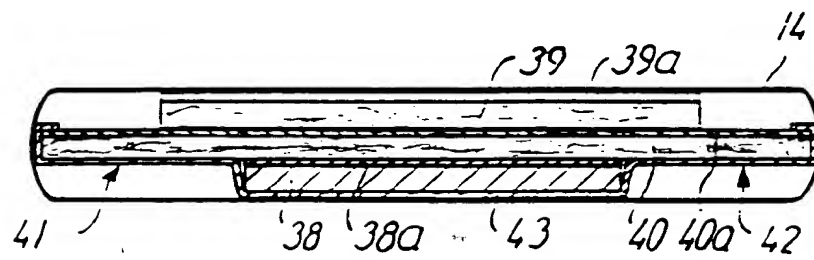


FIG. 7

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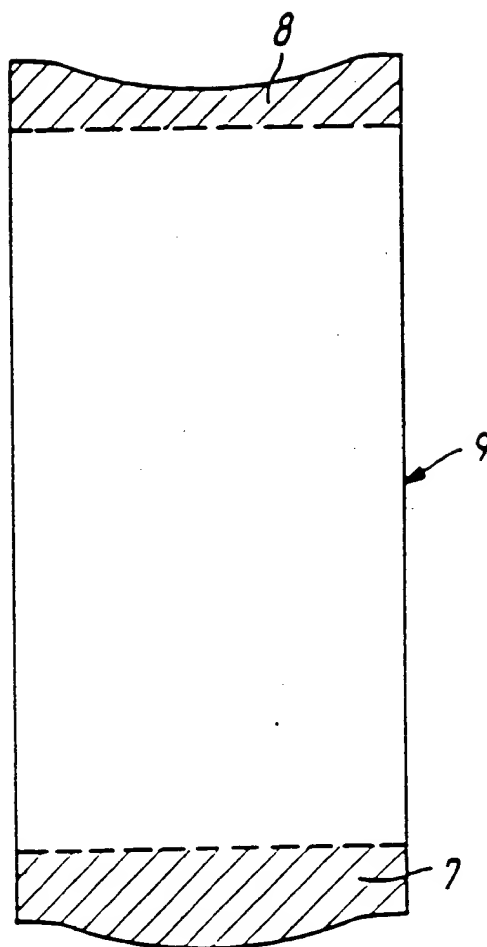


FIG. 8

# INTERNATIONAL SEARCH REPORT

International Application No PCT/DK 92/00087

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup> According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 61 F 13/15																							
<b>II. FIELDS SEARCHED</b> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black;">Minimum Documentation Searched<sup>7</sup></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border-bottom: 1px solid black;">Classification System</th> <th style="border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="padding: 5px;">IPC5</td> <td style="padding: 5px;">A 41 B; A 61 F</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched<sup>8</sup></div> <p style="padding: 5px;">SE,DK,FI,NO classes as above</p>			Classification System	Classification Symbols	IPC5	A 41 B; A 61 F																	
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<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; border-bottom: 1px solid black;">Category *</th> <th style="border-bottom: 1px solid black;">Citation of Document,<sup>11</sup> with indication, where appropriate, of the relevant passages<sup>12</sup></th> <th style="width: 15%; border-bottom: 1px solid black;">Relevant to Claim No.<sup>13</sup></th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">WO, A1, 8601378 (COLOPLAST A/S) 13 March 1986, see page 8 line 26 to page 10 line 12, page 10 line 36 to page 11 line 3, page 13 line 3 to line 8</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,11</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="text-align: center; vertical-align: top; padding: 5px;">--</td> <td style="text-align: center; vertical-align: top; padding: 5px;">2-10, 12</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">DK, B, 153066 (MOLLER &amp; JOCHUMSEN A/S) 13 June 1988, see the whole document</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1-12</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">EP, A1, 0441064 (CHICOPEE) 14 August 1991, see the whole document</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1-12</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">WO, A1, 8502110 (BEGHIN-SAY) 23 May 1985, see the whole document</td> <td style="text-align: center; vertical-align: top; padding: 5px;">2-12</td> </tr> <tr> <td></td> <td style="text-align: center; vertical-align: top; padding: 5px;">-----</td> <td></td> </tr> </table>			Category *	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>	X	WO, A1, 8601378 (COLOPLAST A/S) 13 March 1986, see page 8 line 26 to page 10 line 12, page 10 line 36 to page 11 line 3, page 13 line 3 to line 8	1,11	Y	--	2-10, 12	Y	DK, B, 153066 (MOLLER & JOCHUMSEN A/S) 13 June 1988, see the whole document	1-12	Y	EP, A1, 0441064 (CHICOPEE) 14 August 1991, see the whole document	1-12	Y	WO, A1, 8502110 (BEGHIN-SAY) 23 May 1985, see the whole document	2-12		-----	
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<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><b>* Special categories of cited documents:</b><sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p> </div> </div>																							
<b>IV. CERTIFICATION</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">           Date of the Actual Completion of the International Search  <b>13th July 1992</b> </td> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">           Date of Mailing of this International Search Report  <b>1992 -07- 16</b> </td> </tr> <tr> <td style="border-bottom: 1px solid black; padding: 5px;">           International Searching Authority    <div style="text-align: center;"><b>SWEDISH PATENT OFFICE</b></div> </td> <td style="border-bottom: 1px solid black; padding: 5px;">           Signature of Authorized Officer  <div style="text-align: center;">Ingrid Falk</div> </td> </tr> </table>			Date of the Actual Completion of the International Search <b>13th July 1992</b>	Date of Mailing of this International Search Report <b>1992 -07- 16</b>	International Searching Authority  <div style="text-align: center;"><b>SWEDISH PATENT OFFICE</b></div>	Signature of Authorized Officer <div style="text-align: center;">Ingrid Falk</div>																	
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**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. PCT/DK 92/00087**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 29/05/92. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A1- 8601378	86-03-13	EP-A-B- 0192687 US-A- 4840692	86-09-03 89-06-20
DK-B- 153066	88-06-13	NONE	
EP-A1- 0441064	91-08-14	US-A- 5030229	91-07-09
WO-A1- 8502110	85-05-23	CA-A- 1249401 DE-A- 3474108 EP-A-B- 0163680 FR-A-B- 2554390 JP-T- 61500364 OA-A- 8057 US-A- 4731071	89-01-31 88-10-27 85-12-11 85-05-10 86-03-06 87-03-31 88-03-15



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